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Governing vulnerability: The biopolitics of conservation and climate in upland Southeast Asia

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ABSTRACT

Forest dependent communities are increasingly at the centre of intensifying global aspirations to alleviate both climate change vulnerability and environmental degradation. In Southeast Asia in particular, varied forms of conservation practice fuse concern for biodiversity outcomes with the desire to support 'resilience' and build 'capacity' in the face of environmental change. Drawing on Foucault's notion of biopolitics, this article explores the consequences of efforts to govern both forest decline and human vulnerability. Through this framing, we consider indigenous experiences with the 1997/8 El Niño event in the southern Philippines where conservation efforts have produced unintended outcomes for upland households negotiating the impacts of extreme drought. We demonstrate that efforts to comprehensively reform indigenous life as part of a twinned concern for environmental decline and human vulnerability have produced acute food insecurity during El Niño events by diminishing swiddening practices and related lifeways that buffer against extreme drought – some of the very environmental changes that forest management efforts had hoped to buffer indigenous households against. These insights offer a bridge between contemporary Foucauldian treatments of 'vulnerability' as a potent discursive construct and work within political ecology that aims to empirically understand uneven experiences of environmental change.

1. Introduction

Forest dependent communities are increasingly at the centre of intensifying global aspirations to alleviate both climate change vulnerability and environmental degradation (Larson, 2011; Taylor 2018; Borras & Franco, 2018). In Southeast Asia in particular, varied forms of environmental governance —such as recent efforts to promote 'climate smart' agriculture in which climate change mitigation and adaptation supposedly operate synergistically in tropical landscapes— are seen to provide biodiversity outcomes and reduce the vulnerability of communities confronted by changing or intensifying weather patterns. This relationship is often technically and optimistically framed as supporting 'resilience' or building 'capacity', and positions conservation goals and adaptive capabilities as mutually reinforcing (Tompkins and Adger 2004, p. 10). In this paper, we critically explore the relationship between discourses and practices that fuse environmental protection with the enhancement of vulnerable populations, and build on growing concerns that many interventions to alleviate vulnerability have diminished, rather than enhanced, the capability of rural households to sustain themselves in the face of climatic variation (e.g. Sovacool 2018; Eriksen, Nightingale, & Eakin, 2015; Yeh et al., 2014).

To do so, this paper is concerned with building a more nuanced understanding of the impacts of climate change in rural landscapes. Despite a growing critical interest in human-climate interactions, efforts to understand uneven experiences of climate change within political ecology remain largely focused on, as Watts described in his seminal analysis of famine in the Nigerian Sahel, 'a careful deconstruction of the social, political and economic structure of the society' over time (1983, 19). Influenced by the work of Watts and others, more recent analyses of rural experiences of climate change and changing weather more broadly tend to emphasise political-economic factors that constrain household production, produce compounding forms of uncertainty or shape decision-making through the (often coercive) extraction of surplus (e.g., Bohle, Downing, & Watts, 1994; Raleigh, 2010; Fjelde & von Uexkull, 2012). While these perspectives remain vital in accounting for the historical role of colonial and contemporary political economies in shaping the marginality of rural producers, much less climate change impact research is concerned with how environmental governance shapes people and places through what Michel Foucault has famously described as the 'conduct of conduct'. This paper seeks to integrate a consideration of how agrarian political economies and environmental governance converge to shape experiences of environmental change. Inspired by recent Foucauldian critiques of climate change vulnerability, resilience and adaptation policy frameworks (e.g., Bankoff, 2001; Cameron, 2012; Cavanagh, 2014; Grove, 2014), we turn to Foucault's notion of *biopolitics* as a 'problem space for thinking through how life and power intertwine in contextually specific ways' (Grove, 2018, 152) to explore the unintended outcomes of efforts to

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govern vulnerability in community-based forms of conservation. Rather than a single 'biopolitics of conservation', this approach attends to the specificity of 'overlapping and contradictory logics' that produce complex effects beyond the agency and intentions of any one group (Biermann and Anderson 2017, 1).

Through this conceptual framing, this paper considers how forest management in the Philippines, like much of Southeast Asia, has been increasingly justified through a logic that fuses concerns of conservation with the need to build human capacities as part of a generalized vulnerability discourse. We consider the unintended ramifications of one early permutation of this twinned concern for conservation and vulnerability in a prominent Philippine community-based conservation intervention — the Palawan Tropical Forestry Protection Programme or PTFPP (1995–2002). We suggest that attention to the biopolitical logics of environmental governance can reveal how such discourses open 'individual and collective socio-ecological relations to governmental intervention and regulation' (Grove, 2014, p. 199) or, what Foucault terms, practices of 'optimization' (Foucault, 2003, p. 246). In the case of the PTFPP, indigenous Pala'wan targeted by the project were considered both environmentally destructive and vulnerable to environmental change not only by virtue of their customary agricultural practices but also because their patterns of residency, social relations, levels of education and health and well-being were marked as deficient. Beyond general critiques of vulnerability discourse that point to its depoliticising qualities, a bioplitical framing reveals how calculating and apprehending human-environmental relationships in this way entails fine-grained and comprehensive efforts to intervene in life. As a result, this intervention was focused not on punitively disciplining a single activity but on a much larger goal of reforming social and biological life in the uplands to achieve conservation objectives and secure the well-being of populations in the face of changing weather. Our interrogation of the implementation and impact of the PTFPP over time suggests that widespread discourses of community vulnerability and environmental destructiveness, and the comprehensive management interventions they inspire, hold the potential to paradoxically weaken the ability of rural households to navigate environmental change. As we describe, these efforts have worked to shape livelihoods more generally in ways that exacerbate and create acute forms of insecurity to recurring El Niño droughts on Palawan Island.

By integrating Foucauldian perspectives with critical agrarian studies, our analysis locates the origins of climate-driven hunger and deprivation for indigenous Pala'wan people in the articulation of frontier political-economies with the discursive construction of people and places that justifies comprehensive interventions into indigenous lives. We argue that any efforts to critically engage the relationship between environmental governance and climate change must consider the role of vulnerability discourse itself in motivating comprehensive interventions that, frequently, produce unexpected and negative outcomes for communities. In doing so we contribute to recent efforts in political ecology which seek to examine the ways in which the politics of representation and knowledge, and their material effect, are central to understanding why some people (rather than others) come to be impacted by anthropogenic climate change (e.g. Collins, 2008; Sovacool 2018; Taylor 2013).

The paper first begins by bringing critical perspectives on climate change impacts into conversation with recent critical literature exploring Foucault's notion of biopolitics to understand the governance of human-environment relations. We then explore the converging frontier political economies and forest management efforts that have shaped indigenous lives and livelihoods in barangay[1] Inogbong, southern Palawan Island, from the 1700s to the early 2000s. Emerging from a deep colonial history and recent global governance ideals, we demonstrate how contemporary conservation projects that equate customary livelihoods with socio-ecological vulnerability have sought to limit swidden agriculture, the much-maligned rotational form of cultivation that involves clearing and burning forest cover,[2] and other forest uses through projects that aim to overcome the perceived deficiencies in indigenous health, well-being, education, among other attributes. In the context of such governance persisting in the uplands through ongoing forms of self-disciplining and normalization of conservation discourse, we extend this analysis to consider the impact of the 1997/8 El Niño drought on indigenous Pala'wan livelihood practices and discuss the implications of continuing trajectories of swidden decline and recurring El Niño-driven drought.

The data for this article are derived from the analysis of policy-documentation focusing on forest management on Palawan Island and ethnographic work conducted in the south of the island over the course of 2010–2012. With informed Pala'wan consent, this fieldwork involved the typical suite of ethnographic methods, combining participant observation with a livelihood survey, in-depth interviews with indigenous people and migrant families living in barangay Inogbong and, in particular, extensive oral histories focusing on perceptions of social and environmental change over time with a specific focus on the experiences of the 1997/8 El Niño drought. The climatic data for Palawan Island used to contextual oral histories were collected from the offices of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).

2. Making and governing vulnerability

2.1. Expanding a political ecology of vulnerability

Vulnerability has emerged as a powerful and pervasive analytical concept in the study of human–environment interactions within political ecology. Historically, many of the social sciences, particularly political science, human ecology and human geography, examined vulnerability in terms of the environmental risks and hazards emerging from environmental perturbations (White and Haas 1975), still commonly framed as 'natural hazards' in many normative fields of environmental policy (Turner, 2010, p. 572). Drawing on Marxist political economy, critical scholarship of the 1970s and 1980s noted that vulnerability did not exist in isolation from the scaled political economic interactions of resource access and use (Blaikie & Brookfield, 1987; Wisner 1979). Broadly, this growing body of literature showed that the factors leading to disasters and vulnerability were the effect of both uneven political economic relations and biophysical transformation (Franke & Chasin, 1980; O'Brien 1985; Watts, 1983). A decade or so later, critical research on vulnerability, still tracking a Marxian line, broadened analysis to consider how vulnerability was a product of uneven social and economic relations forged through structural constraints and inequalities in the context of capitalist expansion (Bohle et al., 1994; Ribot 1995). Set in a 'multi-layered and multidimensional social space' (Watts and Bohle 1993), emphasis still centred on the key political, economic and institutional factors that influenced risk of exposures, coping capacities and recovery potential.

These critical perspectives, dominant within much political ecology research concerned with apprehending the empirical realities of rural households facing environmental extremes, offer the potential to provide important insights into how varied forms of environmental governance might shape experiences of climate change. Recent research with rural communities, for example, has continued to demonstrate the ongoing centrality of environmental governance regimes and conservation projects in shaping agrarian political economies (see Borras,

[1] The barangay is the smallest unit of political administration in the Philippines.

[2] Though considerably diverse, swidden agriculture is broadly understood as the rotational clearing, burning, and cropping of forests, typically followed by much longer fallow period.

2009; Peluso and Lund 2011; Corbera, Hunsberger, & Vaddhanaphuti, 2017). The control of resources for the purposes of conservation clearly speaks to seminal agrarian questions of 'Who owns what? Who does what? Who gets what? What do they do with it?' that inform everyday household livelihood struggles and negotiation of environmental change (Bernstein, 2010, p. 22). However, as we describe below, social theory and in particular the work of Michel Foucault has been increasingly applied examine discursive nature and implications of devolved governance and community-oriented conservation, which has long involved more complex questions of control, discipline and punishment. Most 'community-based' projects increasingly depend heavily on practices of persuasion, self-discipline and what Foucault describes as the 'conduct of conduct' to achieve both social and environmental objectives.

In line with these broader shifts in social theory, political ecologists have tentatively begun to examine the ways that experiences of environmental change might be mediated by both political economy *and* diverse concerns over the production of knowledge (e.g., Collins, 2008; Sovacool 2018). In this vein, Taylor (2013, 8–9) has suggested that understanding historical processes of what he terms 'vulnerabilisation' might require greater attention to a host of less straightforward agencies that shape rural communities and landscapes. This includes, for example, the role of transforming subjectivities, the production of environmental knowledge and the politics of representing rural peoples and places. Building on these emerging concerns, we therefore suggest that understanding how governance practice might mediate experiences of environmental change requires an appreciation of how agrarian political economies articulate over time with discursive work of conservation practice.

2.2. Biopolitics and conservation

Agrawal (2005) and others (Li, 2007; Dressler, 2014; McElwee, 2016) have drawn heavily on Michel Foucault's notion of 'governmentality' to understand forms of environmental rule and processes of subjectification in various governance contexts. Drawing on more recent reappraisals of Foucault's conceptualisations of power and government (e.g., Collier, 2009), Fletcher (2010) argues these existing studies that bring governmentality to bear on conservation efforts have tended to emphasise a single 'kind' of governmental rationality (the institutional conditioning of power/knowledge relationships) in understanding how environmental subjectivities are produced. In practice, he notes, 'rather than any unified strategy of governance environmental managers often seek to operationalize multiple strategies simultaneously' (2017, 107).

As 'distinction becomes increasingly blurred between justifications for security interventions in the interest of "human" as opposed to "environmental" or biological health and well-being' (Cavanagh 2018, 410) in environmental policy, Foucault's notion of biopolitics has become a convincingly powerful conceptual tool for a more expansive analysis of governmentality as environmental rule. Foucault's own writing on biopolitics were empirically focused on the shift from the pre-modern sovereign's prerogative to 'take life or let live' to the capacity to 'make live and to let die' (Foucault, 2003, p. 241) in 18th century Europe, more broadly referred to as biopower (Foucault, 1978). Within this shift towards biopower as a wider governmental rationality, Foucault identifies two key 'technologies of power'; first, the disciplining the body ("anatamo-politics") and the regulation of populations in terms of their biological processes ("biopolitics") (Anderson 2012). Yet, Foucault (2003, 242) also notes that rather than rigidly bound distinctions these categories can be conceived as blurred. He suggests that '[biopolitics] does not exclude the former [anatamo-politics], does not exclude disciplinary technology, but it does dovetail into it, integrate it, modify it to some extent, and above all, use it by sort of infiltrating it, embedding itself in existing disciplinary techniques.' In line with this broad interpretation, the use of biopolitics has now come to concern how the 'basic biological features of the human species' become the object of political strategy (Foucault, 2007, p. 16) and how these strategies are exercised in the interest of 'life itself' (Rose 2009).

Rather than establishing a series of typologies, however, Grove argues that the value of a biopolitical analysis is in opening possibilities to explore 'how life and power intertwine' and the political 'effects' of this entwinement in the world (Grove, 2018, 154). Critical scholars have therefore aimed not to identify 'a single "conservation biopolitics" but instead an entanglement of overlapping and contradictory logics and techniques' focused on reforming social and biological worlds in the work of environmental governance (Biermann and Anderson 2017, 1; see also Cavanagh and Benjaminsen 2015; Nel, 2015; Cavanagh 2018; Fletcher, Dressler, Anderson, & Büscher, 2018).

2.3. Vulnerability discourse in environmental governance

A key concern for critical scholars and has been the emergence of 'vulnerability' as a tool for diagnosing and managing populations within global environmental governance and disaster management, often fused with general socio-ecological systems thinking and distanced from the critical language of political ecology (Eriksen et al., 2015; Watts 2015). Rather than political-economic histories, this fusion often means that 'the key parameters of vulnerability are the stresses to which a system is exposed, its sensitivity, and its adaptive capacity' (Adger, 2006, p. 269). Indeed, most projects of environmental governance globally now aim to manage vulnerability through enhancing 'resilience' or building 'capacity' of targeted communities in some fashion as part of efforts to reform resource use by addressing the multifaceted character of life and livelihood (Cavanagh, 2014). Critical analyses of vulnerability frameworks have identified the de-politicising work that this discourse performs (Bankoff, 2001; Nadasdy, 2007). Birkenholtz (2012, 5), for example, argues that resilience thinking 'abstract [s] social-ecological systems from the political economic relations in which they are embedded' and, in doing so, shifts focus away from the political economy of resource access towards technical or managerial solutions.

Beyond this general attention to 'vulnerability' as a depoliticising discourse, Cavanagh (2014, 283) notes, that the term now 'constitutes the primary bio-political object of concern under processes of global environmental change'. Bringing the notion of biopolitics to bear on the varied ways that vulnerability is figured and performed in conservation practice can fruitfully draw out not only the ways in which life is conceived, but more significantly, how such discourse manifests in the formulation of specific policies and their potentially unruly effects. As Grove (2014) suggests, vulnerability frameworks in climate change impact studies and policy reflect not only a form of de-politicisation but 'system [s] of knowledge [that] produce truths about uncertain life and how to secure this life through specific techniques of knowledge production' (199). As such, vulnerability discourses can be conceived of as 'biopolitical' not only because they might statistically apprehend populations or the focus on specific biological qualities but 'because they endeavour to render life amenable to calculated governmental interventions' by framing otherwise varied human activity as stable, ordered and able to be secured through appropriate policy intervention (Grove, 2014, p. 199). As we demonstrate, designations of environmental destructiveness and vulnerability in contemporary forest management schemes throughout Southeast Asia problematize populations through the highly specific and detailed calculation of social and biological deficiency. Attention to these specific conceptualisations provides important insights into how communities are opened to wide ranging strategies aiming to 'administer, optimize, and multiply … [life], subjecting it to precise controls and comprehensive regulations' (Foucault, 1978, p. 137).

This generalized vulnerability discourse is well established in environmental governance in Southeast Asia, where global and national forest conservation efforts increasingly justify interventions into the

lives of varied populations on the basis of reducing the vulnerability to social and environmental change, whether framed explicitly in terms of fragility to climate change and/or the generalized need to secure human life in the face of economic disruption and violence. Perhaps the most striking convergence of conservation efforts and vulnerability reduction in the region has been the rise of carbon sequestration schemes (such as REDD+) with efforts to promote adaptive 'climate smart' agriculture (Borras & Franco, 2018, pp. 1–18; Chandra, McNamara, & Dargusch, 2018; Taylor 2018). These twinned concerns are today widely seen to be the product not only of specific activities or a generalized poverty but an overlapping (even contradictory) set of concerns surrounding education, poor nutrition and healthcare or residency in remote or marginal places.[3]

These connections between discursive framings of life and their varied socio-material effects are central to understanding how conservation might shape experiences of environmental change over time and space. As we show, an examination of the biopolitical nature of social forestry in the Philippines, focused on comprehensively reforming upland living to produce environmentally-conscious and materially secure subjects, demonstrates how community-based projects have extraordinarily broad mandates to intervene not only into the direct interface between humans and forest resources (e.g., swidden cultivation) but increasingly fine-grained features of indigenous 'life itself' to achieve conservation objectives.

3. The biopolitics of environmental governance in barangay inogbong, Palawan Island

3.1. Forest management and frontier settlement (1700–1995)

The east coast of southern Palawan Island is characterised by a sharp socio-spatial relief divided between the flat coastal plain and steep valleys of the interior mountain range (Fig. 1). In the barangay of Inogbong, located in the municipality of Bataraza, approximately 100 indigenous households reside on the state-owned forestlands of the barangay, grouped in hamlets ranging in size from three to twenty households. The livelihoods of the indigenous Pala'wan people in this area have historically been based around biodiverse, long-fallowed swidden agriculture combined with the extraction and supply of forest products for regional markets. In contrast, the lowland coastal plain is dominated by paddy fields and commercial coconut plantations owned by households of recent migrant origin who, since the 1950s, have increasingly come to command uneven economic relationships with indigenous households. While recent decades have seen indigenous livelihoods become increasingly diverse and sedentary as some households engage with new economic opportunities in the lowlands or adopt paddy rice or commercial agroforestry, Pala'wan households have little legal claim over productive resources in the area and have incomes and stores of capital far smaller than migrant households—a socio-economic difference that powerfully informs why conservation actors intervene in the uplands.

While Pala'wan livelihoods have long been mediated by the regional influence of the Sulu Sultanate (18th to the late 19th centuries), the most recent and profound transformations to swidden-based livelihoods have been due to the arrival of homesteading migrants from more densely populated Philippine islands beginning in the 1950s (see Brown, 1991). Land initially cleared as swidden by Christian settlers was progressively transformed into permanent paddy fields and later became the basis of migrant tenurial claims in the emerging national land claims bureaucracy on the island. As migrant paddy fields came to produce surpluses, indigenous households entered into enduring

Fig. 1. View of Inogbong from the uplands.

patron–client relationships with lowland farmers who would advance Pala'wan people cash, rice, medicine and coffee. Though Pala'wan initially resisted working in lowland fields planting and harvesting rice as it was considered unhygienic, their debt obligations to Christian migrants and need for cash income eventually facilitated not only their participation in lowland labour markets but also their dispossession from the coastal plains.

In a clear articulation of frontier political economy with conservation practice, the bureaucratic delineation of the mountainous uplands of Palawan as state-owned forestlands overlapped these processes of expropriation. As the American colonial administration (and later the Philippine government) established bureaucratic infrastructure on Palawan Island during the early 20th century, the uplands of southern Palawan were progressively delineated by surveyors from the Bureau of Forestry in accordance with the aim of conserving heavily forested areas for future commercial exploitation. Areas deemed to have significant timber reserves were classified as forestland – technically 'Timberlands'– whereas those more valuable for agriculture (and settlement) were released as alienable and disposable lands. In these upland areas, livelihoods could potentially be monitored and modernised relative to those livelihoods in the lowlands where agriculture was deemed productive and aligned with economic development. As we discuss, these land-use categories and associated livelihoods can be seen as focal points for the emergence of conservation efforts concerned not only with simply eliminating swidden agriculture but with the comprehensive reforming of indigenous people's lives.

3.2. The biopolitics of intensifying community-based forest management and the Palawan Tropical Forestry Protection Programme (1995–2002)

This history of frontier settlement and the post-War period enforcement of forest laws that relied largely on haphazard fines and threats of imprisonment only partly explains the marginalisation of indigenous people and their contemporary and recurring experiences during El Niño-driven drought events. As elsewhere, the Philippines made a shift away from the largely punitive and exclusionary management of shifting cultivators in state forestlands towards more community-based approaches from the 1980s onwards that were increasingly focused on transforming upland peoples into model resource users rather than bluntly excluding them from their ancestral lands (Pulhin and Pulhin 2003). Through a series of socially oriented forestry programs, a discourse of community-based forest management emerged that emphasised not only the environmental benefits of sedentary, non-swidden lifestyles, but has become increasingly concerned with the perceived education, health and overall well-being of indigenous peoples as populations. While colonial governments tended to target and manage specific livelihoods, in the post-colonial period new actors with devolved agendas reach further upland with an assemblage of

[3] The United Nation's Sustainable Development Goals, for example, are often mobilized in building connections between 'sustainable' practices and a more expansively conceived 'life'.

techniques and practices of reform among indigenous peoples in the uplands (see Li, 2007). As a result, many new community-based efforts aimed to address the deficiencies of customary life as a way to achieve forest conservation efforts and, in doing so, reform the environmental attitudes and actions of indigenous residents. On Palawan Island, these efforts would unfold against and were informed by an uneven agrarian political economy defined by the socio-spatial marginalisation of indigenous peoples and their adverse incorporation into highly dependent relations with lowland paddy farmers and other economic intermediaries in the forest product trade.

The Palawan Tropical Protection Forestry Programme (PTFPP, 1995–2002), a para-statal organisation funded by the European Union and initially co-led by Filipino and European directors, was an early and prominent example of community-based conservation that would comprehensively put into practice a logic that linked both environmentally destructive behaviour and vulnerability to weather to a wide range of deficiencies in indigenous upland 'life'. Primarily, the PTFPP was initiated in Inogbong as a means to reduce reliance on certain kinds of forest resource extraction (such as timber and wildlife poaching) and facilitate reforestation. This was done in large part to mitigate the perceived forest degradation resulting from indigenous swiddening that had long been viewed in the Philippines as the primary cause of deforestation. The PTFPP was designed to implement the then-recently legislated Environmentally Critical Areas Network (ECAN) – a statutory land-use scheme covering the province that heavily proscribed indigenous land use and resource access in the mountainous interior of the island (PCSD 1992). The program was partly drawn from existing trends and objectives in Philippine forestry, but was also a site of transnational governance that linked Philippine imperatives with global perspectives popular in development practices. However, in addition to the need to protect environmental resources, the project was guided by the imperative to reduce indigenous vulnerability to environmental change. Guiding policy documentation emphasised that;

> *Forests are important for everyone but especially for the people living close to them or in them. The forest is an important source of food (meat, root crops, fruit) and livelihood (rattan, almaciga, honey). Forests also help to maintain normal rainfall and temperatures. If the forests of Palawan were removed it is likely that rainfall would be reduced, it would be hotter and dry periods would be longer. The forest also helps to maintain normal river flow. Without forests rivers soon stop flowing in dry periods and flash floods can occur. Such flash floods cause a lot of damage by eroding river banks, washing away roads and damaging houses.*

The PTFPP was influenced by prevailing trajectories of community-based forest management in the Philippines and globally that understood both this vulnerability and environmentally destructive behaviour as the product of deficiencies in indigenous social and biological life that, in turn, rendered these features open to finely detailed-intervention to overcome these deficiencies. Most directly, efforts to address these broad concerns centred on enhancing indigenous livelihoods. Like earlier social forestry programs enacted on Palawan Island, much of the PTFPP's policy was developed by foreign consultants who drew on widely circulating livelihoods approaches that emphasised, in the words of project staff, the need to 'assist rural communities to intensify and diversify their agriculture whilst at the same time safeguarding the forest' (Craggs 1998). Guiding documentation emphasised livelihoods as focal points of transformation and suggested prominently (in capital letters) that 'SUSTAINABILITY = PRODUCTIVITY + CONSERVATION OF RESOURCES' (Craggs 1998). In line with provincial ECAN objectives and broader transnational sustainability ideals, the core concern of the PTFPP in Inogbong was therefore to enhance indigenous livelihoods towards more sedentary, fixed-plot production and support environmental awareness education in order to support conservation and overcome the preassigned fragility of indigenous livelihoods. To achieve this aim, PTFPP project officers in Inogbong worked to establish a variety of alternatives to swidden agriculture. Agroforestry initiatives were most heavily promoted as the means by which to provide access to cash income and securely fixed lives, alongside a bewildering array of market-oriented options, including goat raising, piggeries, handicraft production, among others (Smith and Dressler 2017).

Agroforestry and other livelihood interventions targeting swidden were an essential, but not sufficient, condition for achieving conservation objectives or securing human life in forests. Strikingly, PTFPP efforts were concerned not only with eliminating swidden but the fundamental reorganisation of the lives of targeted populations through projects and discourse that closely connected environmental protection with human health, education, social relations, political organisation and residence patterns. Improving health, for example, was explicitly linked to achieving environmental aims and surveys conducted as part of project delivery sought to elicit the prevalence of communicable diseases, such as malaria and tuberculosis, among indigenous households. In turn, project documentation identified the poor health of indigenous Pala'wan as a key dimension of their environmental destructiveness, explained in the PTFPP-authored catchment management plan:

> *Health is wealth. Poor health means lesser wealth. Poor health requires needed income for medication. The natural resources are threatened as their exploitation provides the easiest means of acquiring extra income for medical treatment. Poor health also links to lesser productivity. This would mean lesser capability to work, lesser competence to lifer [sic] and lesser access to other resources other than the forest for living. (*PTFPP 2002*, 29)*

In a concrete manifestation of this aim, in cooperation with then-named German Agency for Technical Cooperation (GTZ), PTFPP and local government officials established a water supply system that could pipe water from two deep well pumps to the centre of three upland hamlets (PTFPP 2002). As with many of the program's projects, the benefits were concentrated in areas deemed to be already degraded by human occupation, thereby encouraging residence away from environmentally sensitive areas identified under the ECAN. This intervention thus built on and reinforced the already unfolding process of many Pala'wan gradually residing in mid elevation and lowland areas.

Similarly, education was identified in project documentation as a key focus, insofar as it increased environmental awareness:

> *Proper education is empirical [sic] for the community to understand the value of the catchment, hence, make them move towards its protection. As long as the dependents [sic] have grasped and have full understanding of environment and resource management is all about, there's no more false hopes that the vision of having a protected forest will not carry on. (*PTFPP 2002*, 29)*

This line of thinking underlay the establishment of a Tribal Learning Centre in the centre of the barangay that provided, at the time, free education for indigenous children in addition to adult learners. Alongside a general education, the Tribal Learning Centre sought to convey explicitly environmental messages and promote a spatial concentration of indigenous residences (Smith and Dressler 2017).

Finally, in addition to health, residence and education, the PTFPP's projects were also concerned with reconfiguring what were perceived to inadequate indigenous patterns of social relations and political organisation. Although project officers spent considerable time living and working among Pala'wan households in the uplands communicating, facilitating and sustaining conservationist discourse, these ideas were ultimately sustained in place through the enrolment of willing indigenous leaders, or *panglima*, into the dissemination efforts as brokers of environmental ideas. A key objective of this approach was the establishment of a network of willing customary leaders who were given appropriate 'leadership training', either in Inogbong or on other parts of the island, to instil the needed willingness and confidence to lead their

communities into sustainable resouce use. This training was aided by the production of a new physical infrastructure of political oragnisation, such as the construction of meeting halls in the style of indigenous 'big houses' (*kelang benwa*) where it was envisioned panglima would gather and disseminate environmental messages (Hobbes, 2000). In another notable example, radio sets were distributed to indigenous households in exchange for participating in reforestation efforts, in part to facilitate access to a PTFPP-established radio station (*Oras ng mga Katatubo*, 'the hour of indigenous people') through which indigenous community leaders delivered environmental messages and supported tree-planting activities.

As quotes from project documentation highlight, underpinning these interventions was the need to enhance indigenous households, who were vulnerable to change as a result of their own deficient social and biological characteristics that the project implicated in destructive forms of forest use. These were narrow conceptions of indigenous, based on assumptions rather than existing bodies of research, in which poor health and education were perpetuated by the inability to secure, for example, medication or basic schooling. PTFPP policy discourses of indigenous deficiency in a broadly construed 'life' positioned not only health but education, residency and local social and political relations as open to, in Foucault's terminology (1978, 137), optimization through efforts to develop 'precise controls and comprehensive regulations'. As we demonstrate below, the comprehensive nature intervention came to have a long-standing impact on indigenous environmental rhetoric and livelihood decision-making and has thus shaped pathways of vulnerability to El Niño drought events in ways that built on and furthered pre-existing frontier political-economies.

3.3. Brokering change: the ongoing impacts of environmental governance

In part facilitated by the PTFPP intervention, many Pala'wan had already begun to shift to more sedentary agricultural practices because of the intensive rhetorical pressure on swiddening alongside the adverse incorporated of indigenous people into lowland frontier economies. Since the project's end in 2002, these ideas continue to be brokered by Pala'wan leaders and households themselves and have shaped ongoing shifts away from swidden agriculture. Survey data collected in Inogbong from 2011 to 12 taken from Pala'wan households throughout upland hamlets in Inogbong indicate that the practice of and assets related to market-based activities, including those the PTFPP strengthened or tolerated, have become deeply, though unevenly, central to indigenous livelihoods (Table 1). Many households now increasingly rely on some combination of sedentary paddy rice farming, waged labour and the sale of non-cereal crops to local markets. Labouring in migrant fields, known as *arawan*, has become a crucial and often solitary source of cash income for many Pala'wan households. As this data indicates, there is a growing divide between households who reside in the foothills of the barangay –closer to migrant economic networks and more heavily targeted by governance interventions- and those who reside deeper into the forest interior who rely less heavily on capital intensive inputs such as fertilizer and water buffalos (carabao, *Bubalus bubalis)*.

Table 1
Measures of market integration and livelihood diversification.

	Foothills (*n* = 34)	*Forest interior* (*n* = 29)
Paddy rice field	16	2
Use of insecticide/herbicide in paddy field	11	1
Sold paddy surplus	7	0
Sold almaciga resin	1	7
Sold copra	7	7
Own or may readily access carabao	16	4
Average days of day labour (*arawan*, days per year of male household head)	64	30

Table 2
Self-reported rice yields in Pala'wan swidden fields between 1995 and 2010.

	1995 (n = 43)	2010 (n = 56)
Average size of main swidden plot (ha)	0.71 ha	0.68 ha
Average amount of rice planted (kg)	29.19 kg	30.20 kg
Average amount of rice harvested (kg)	239.00 kg	181.85 kg
Average rice yield per hectare (kg/ha)	336.00 kg	267.42 kg

While Pala'wan people have long engaged in relations of production and exchange within wider economic networks, these livelihood activities now increasingly come at the expense of swidden, which is viewed as in decline by many indigenous people. For example, self-reported survey data regarding swidden size and yield from 1995 to 2010 indicates a general perception of decline that generates interest in other ways of making a living (Table 2). Another measure of this decline can be seen in the greatly reduced biodiversity in crop-mixes among younger and more affluent farmers. Broadly, relative to other forms of livelihood, swidden has come to be viewed as unproductive (though by no means worthless). One Pala'wan man, for example, articulated the benefits of paddy rice over swidden,

> *In swidden it is very rare to have a good harvest but in paddy rice, after you have planted, you just wait for the harvest and it has minimal maintenance. You just spray the herbicide and insecticide. So that is one of the advantages.*

At the same time, although many households have shifted to other forms of sedentary agriculture and cash-oriented production, survey data and ethnographic work in Inogbong indicates that most households continue to depend heavily on swidden and value it culturally. In particular, many poor indigenous households consider swidden as central to broader familial aspirations for regular supplies of rice and as a known buffer against broader livelihood uncertainty.

Yet the ongoing brokerage of ideas surrounding the vulnerability of swidden-based livelihoods and the 'robustness' of sedentary and market-based livelihoods continues to motivate both external interventions into indigenous livelihoods and indigenous people's own livelihood decision making. Although the PTFPP ended in 2002, the impacts of its forest management efforts linger powerfully in the atmosphere of uncertainty and criminality that now surrounds the clearing of forests for agriculture in the uplands. For example, many households believe the PTFPP has retained the use of local Pala'wan informers to monitor the clearing of forests for swidden and suggest that passing helicopters and planes are monitoring indigenous people's activities. While passing aircraft may not be reporting back to government officials, these discourses speak to very real concerns that facilitate degrees of disciplining and control; the municipality's enforcement of national environmental regulation through the local environmental enforcement group *Bataraza Bantay Bayan* [Bataraza city guard] makes use of paid informers among indigenous households to apprehend poachers and illegal loggers or farmers who fell old-growth forests. For example, one Pala'wan customary leader noted that,

> *For me the reason why our harvest is declining is because we can't clear the large trees. Because you know if you don't clear in large trees, before you even tugda [dibble rice] there are many weeds but if you clear in large trees your rice will become large in size … If it is not forbidden I want to make a swidden in the area with large trees but since the gobynero [government] won't allow us we just stay to our old swidden, but before it is not forbidden that's why we have a good harvest but now we only cultivate in the cogon grass [Imperata cylindrica] area … because we can't replace the plant because we are not allowed to make swidden so the result the weeds grow there.*

As important, however, has been the internalisation and

reproduction of PTFPP rhetoric by indigenous leaders who could broker ongoing conservation projects in the area. Some local customary leaders, elevated by PTFPP project officers and ongoing forest management programs, also continue to reinforce multifaceted social and environmental narratives that emphasise virtues of 'staying put' –entailing sedentary residence away from valued and close to the social infrastructure established by the PTFPP and local governments– as an ideal way of living in forest lands (Smith and Dressler 2017). The framing of non-swidden lives, in terms of agricultural productivity but also as improvements in education and dignity, are a recurring feature of discussions with local leaders in the absence of a continuing PTFPP presence. In turn, many Pala'wan households reference the continued work of indigenous leaders in espousing PTFPP rhetoric and laying out visions for life in the uplands. For many panglima and other influential men, aligning with these narratives, and enrolling others in them, is an important part of ensuring control of the material benefits that stem from successive governmental interventions in Inogbong.

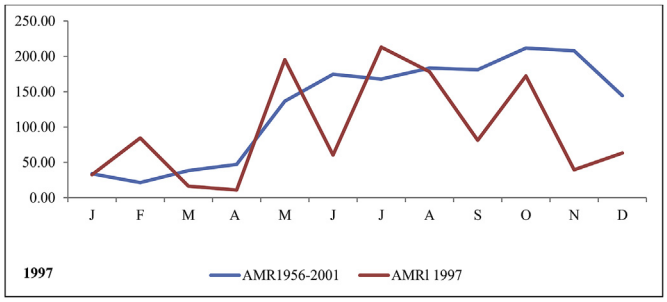
Rather than a single biopolitical logic driving transformation of livelihoods, these descriptions of PTFPP discourses taking on a life of their own require a more diffuse conception of governance impacts. In place of a strict continuation of PTFPP policy, the project's aims have been partly taken up and refracted through the aspirations of indigenous political leaders who selectively adopt project rhetoric to secure their positions as brokers between external interventions and other indigenous households. Gossip and rumour converge with older discourses and the shifting aspirations of Pala'wan people. In doing so, some elements of older governance ideals gain prominence and others are discarded in an uneven accretion over time. This process of 'mutation' helps explain the lingering impact of PTFPP material interventions and rhetoric long after the project's completion, and in ways never intended by staff and policy makers. As we show below, this continued construction of swidden agriculture (and what are understood to be 'traditional' lifeways) as vulnerable can generate significant risk in the context of extreme weather events such as El Niño droughts.

4. Converging impacts and responses to the 1997/8 El Niño drought in inogbong

4.1. Threatened livelihoods, food insecurity and drought in 1997/8

The expansive and detailed interventions into Pala'wan life in Inogbong were legitimated through discourses that positioned not only indigenous livelihoods but also lives as deficient. In addition to the direct focus eliminating swidden agriculture, the PTFPP aimed to explicitly reorganize indigenous life (health, residence, education, and so on) in service of conservationist ends to render households and their productive capabilities as modern, sedentary and secure. Although there are long documented histories of livelihood change among indigenous households on Palawan Island (see Macdonald, 2007), the resurgent intensification of forest management in the 1990s in Inogbong has played an important role in further inculcating anti-swidden attitudes in local leaders and prompting a growing number of households to move into non-swidden pursuits and nominally 'modern' lives more generally. While historically swidden livelihoods on Palawan Island and the Philippines more broadly have been understood as well adapted to climatic variability (see Conklin, 1957; Olofson 1981; Warner 1979), we suggest the increasing reliance on irrigated rice, commercial agroforestry and wage labour, often at the expense of swidden, has created new and largely unknown points of vulnerability to extreme climate events.

To make this argument, we focus on the impacts and responses to the 1997/8 El Niño, widely recognised as one of the most severe drought events in the recent history of Southeast Asia and which was associated with widespread food shortages and forest fires that greatly impacted rural communities throughout the region (Chokkalingam, Kurniawan, & Ruchiat, 2005). Within the Philippines, approximately



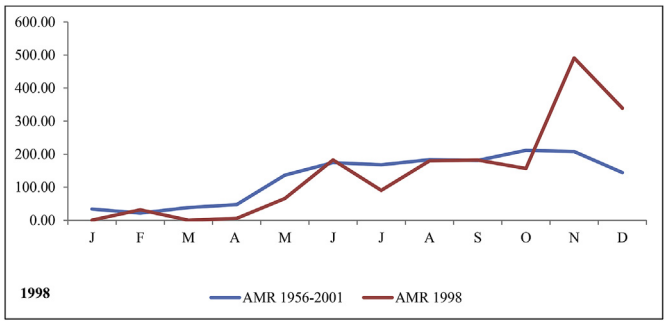


Fig. 2. Average monthly rainfall (AMR) in 1997 and 1998 compared to historical averages (1956–2001) in Brooke's Point, Palawan, Philippines (source: Philippine Atmospheric Geophysical and Astronomical Services Administration.).

70% of the country experienced a severe drought, resulting in significant decline in rice and corn production, water shortages and forest fires (Hilario, De Guzman, Ortega, Hayman, & Alexander, 2009). The event disproportionately affected the south of the archipelago (including Palawan Island), which is seen to be most vulnerable to El Niño-induced drought (Holden, 2012, p. 65). In southern Palawan, local climatic data indicates below-average rainfall during the usually wet southwest monsoon season, becoming particularly acute in the final quarter of 1997 and early 1998 before sharply transitioning to La Niña conditions at the end of the year and above average rainfall (see Fig. 2).

Pala'wan oral histories suggested that there was no rain for seven to nine months, approximately between December 1996 and August 1997, with below-average rainfall continuing until 1998. Pala'wan individuals who had established their households and livelihoods by 1997 suggest the impact of lower-than-expected rainfall on swidden production was uniquely devastating within living memory, an impact that is in accordance with broader experiences throughout the archipelago and Southeast Asia. Over the course of the drought, almost all forms of agriculture were severely impacted by the event, though some fared worse than others. In general, as we show, swidden root crops and wild food sources resisted and, in some cases, survived the period of extreme heat, while swidden rice, paddy rice and commercial cash-cropping livelihood activities were significantly impacted. As the governance efforts of the PTFPP were beginning to unfold in Inogbong at this time, shifts away from swidden agriculture and the differential impacts of drought on livelihoods offer insights into how vulnerability might be conditioned by conservation efforts in oblique and indirect ways.

In 1997, many households relied on a suite of market-based activities to facilitate household reproduction including wage labour, cash cropping agroforestry and paddy farming. The severe drought had a significant and devastating impact on all of these activities connected to lowland agriculture. Wage labour in lowland paddy fields, an increasingly important source of cash income for many Pala'wan households since the 1960s, was particularly impacted, as the Inogbong River ran dry and starved lowland paddy fields of irrigable water. Though some lowland migrant farmers were able to continue cropping schedules by

exploiting small springs, the vast majority of paddy rice farming in the lowlands, and the supply of waged employment for Pala'wan, ceased. A Pala'wan woman explained the double impact of reduced employment and higher prices for rice:

> *There is still some work but very seldom, and if they [lowland farmers] need someone to work, they want to finish the work in one day only …. And also all of Bataraza is affected during that time, so there is a shortage of rice and we imported rice from the neighbouring countries and it cost 120 pesos per ganta.*

With less access to cash income due to declining wage labour on parched and inoperable paddy fields, many Pala'wan families found it increasingly difficult to purchase foods that they had once grown themselves.

This insecurity was further amplified as many indigenous households experienced a total crop failure in their upland plots. Indeed, compounded by below-average rainfall in 1996, swidden crops planted in March–May of 1997 died as substantial rain failed to arrive. It is unsurprising that climatically sensitive rice was crippled by a lack of rain during sensitive cropping periods but, on top of this, many households also reported that even cassava, other staple root crops and usually resilient banana and coconut trees failed to grow or were stunted. Existing stocks of food, such as cassava in old swidden plots, were damaged by intense heat and became inedible. As swidden plots, upland and lowland paddy fields and other income-generating activities successively failed over the course of 1997 and 1998, Pala'wan households could barely secure basic subsistence from their own agricultural practices or through cash income.

4.2. Finding foods in (swidden) forests

As stocks of existing food sources were exhausted or failed and the 1998 cropping season was delayed beyond March–April of that year, Pala'wan households reported obtaining sufficient food through a diversity of sources in the uplands. While limited relief goods (such as canned foods) were distributed to Pala'wan households through municipal and barangay calamity funds, the most important source of subsistence were 'wild' foods obtained from former swidden fallows and older forests further upland, practices directly and indirectly discouraged under ECAN-guided efforts to reduce or remove human use and occupancy of more heavily forested zones. Primarily, this meant Pala'wan collected wild tubers, fruit crops, sago and to a lesser extent wild grains, vegetables and other famine foods located in human-modified forests.[4] Many of these sources, although easy to access from nearby forested areas, require extensive processing in order to be edible or to remove poisons. For example, *kedut,* a wild yam (*Dioscorea hispida*), was noted in oral histories to be a common source of food as the drought progressed; though considered plentiful it must be grated or sliced and soaked in a flowing river for several days to leach out excessive alkaloids (a process that became difficult as the Inogbong River ran dry). Other sources, such as wild fruits, required long treks into the mountainous uplands. In general, oral histories of the time suggest that such wild foods formed the bulk of subsistence during particularly desperate periods of the drought. Upland swidden fallows and forests served not only as sources of emergency subsistence foods but also potential income generations for Pala'wan as the extraction of forest products remained at least partially viable during 1997/8. For example, small-scale illegal logging, long a source of cash income for Pala'wan households, was an important buffer against food shortage for some households. Though the trade had been tempered with the rise of somewhat effective state enforcement of timber concessions in the 1970s and 80s, oral histories suggest that increasing desperation amongst both indigenous people and migrants prompted a mild resurgence in illegal logging in the area. Rather than harvest and sell timber themselves, some Pala'wan men acted as guides for migrant loggers by locating and assisting the transportation of raw timber. The collection of upland *bagtik* (Almaciga resin, *Agathis philippinensis*) also proved to be an important source of income for some households living in the forest interior who had sustained experience collecting forest products over great distances.

Though collecting wild fruits and tubers and purchasing relief rice were vital means to obtain food as the drought progressed, initial subsistence was often secured from more remote swidden plots further in the mountains. While reports of total crop failure were widespread, households and swiddens located in the forest interior were impacted to a lesser degree than those closer to the lowlands, as upland topography is palpably moister, cooler and less likely to dry completely during drought. In these areas, small plots of existing cassava and other root crops survived the initial lack of rain in the area (see also Dressler et al., 2017). For those Pala'wan in the foothills, leveraging social relations and norms of reciprocity with their less-impacted kin in the forest interior served as a valued means of sourcing subsistence. This was primarily focused around root crop exchange. As one Pala'wan woman described, drawing food from upland kin was part of a range of strategies to ensure adequate food,

> *I didn't have a piggery that time, so we really experienced hunger. But my cousin living in the mountains, they still had cassava, so we go there and ask for cassava. And not only that, if there is someone who will hire labourers, I will also work … Sometimes we also get sarawak, and then apari [wild yams] and it has many thorns so we must be careful when getting it.*

Another man recalled that 'some of us were able to plant some root crops so they have food. But for us we just ask for some food from our relatives and neighbours who still have food [in the mountains].' The use of existing social relations between Pala'wan residing in the forest interior and the foothills became important in not only providing an additional source of food in times of hardship, but also ensuring the long-term survival of swidden production after the drought had ended. Beyond securing immediate subsistence, many households leveraged the same social relations to secure seed-rice for the following year's swidden.

As such, although the impact of the 1997/8 El Niño-induced drought on agricultural production was severe, Pala'wan swiddening households had a wide range of strategies to secure subsistence immediately and into the future. The extensive use of wild root crops and income-generating activities meant low mortality arising from starvation, at least to the extent that such descriptions did not feature prominently in oral histories. This seems to have been the case throughout Palawan Island. Any deaths from the drought were attributed directly to exposure to forest fires rather than starvation (Florece et al., 2002). By drawing primarily on a range of forest resources, households overcame degrees of vulnerability by being able to secure an adequate amount of food (though enduring a diet that was unpleasant and devoid of socially and culturally valued rice). Furthermore, the careful maintenance of seed stock and its subsequent dispersal facilitated the re-establishment of swidden rice crops in 1998.

These accounts highlight two key points. Firstly, oral histories clearly identify that while held as ostensibly 'poor', 'vulnerable' farmers, many Pala'wan families were able to draw on stocks of wild root crops and access upland swiddens for cassava as a source of emergency food. Key factors in securing these sources were residence in the mountainous uplands, with strong links between families across the upland–lowland gradient, regular use and exploitation of wild forest resources and hardy varieties of crops planted in swidden plots – all activities discouraged under the PTFPP and ongoing forest management initiatives guided by restrictive ECAN zoning which promoted non-

[4] These include sago palms (*batbat*), yams such as *apari* and *sarawak*, and a wide variety of fruits, grains and other vegetable foods such as champada (*badak*), wild sugarcane (*tugbu*), padi oat (*bagu*) and cabbage palm (*buri*).

swidden pursuits and a 'modern' life away from the steeply forested interior. Conversely, these accounts also demonstrate the fragility of increasingly popular market-oriented, sedentary livelihood activities in extreme drought conditions—the core livelihoods of supposedly 'wealthier', 'less vulnerable' farmers. Households that had enthusiastically grasped new livelihood activities, such as waged labour, irrigated paddy farming and cash cropping – encouraged or supported through conservation initiatives – found their productive capabilities sharply curtailed by the drought with few alternatives for food procurement or income generation.

4.3. New livelihoods and new vulnerability (1998–2012)

Our synthesis of various oral histories of the 1997/8 El Niño event demonstrate the robustness of swidden agricultural strategies and other aspects of indigenous lifeways (such as residence in the forest interior) in the face of extreme drought conditions. The importance of swidden agriculture as a drought-resistant form of production was not lost on Pala'wan people. Indeed, evidence from in-depth interviews with Pala'wan households suggests that an emphasis on planting a large amount of drought-resistant crops, such as cassava, sits at the centre of contemporary Pala'wan efforts to buffer subsistence against future severe drought, which is recognised as a cyclical inevitability. For example, one Pala'wan man justified emphasis on root crop production by noting that such events may reoccur:

> *We also heard that it might happen again in the coming years so what we are doing right now, we are planting more root crops, coconut and other fruit trees so that if that time will come we have something to eat.*

Many Pala'wan people perceived a significant change in the amount and emphasis given to root crops with swiddens, often explicitly in response to extreme drought. For example, when asked if such large numbers of cassava were common during 1997/8, one Pala'wan swidden farmer explained the link between cassava and food security:

> *No, that's why before we experience hunger, for example [my father] he only planted five hundred cassava plants for one year so I said, in my mind, it is not enough for the whole year so I've decided to plant ten thousand cassava plants.*

These responsive strategies clearly point to the continued value that Pala'wan farmers place on cultivating swidden in the context of pressures from El Niño drought, governance and agrarian change.

However, despite this and other empirical evidence that shows how swiddens and forest-use landscapes can ensure food security amid multiple constraints from climate stress and uneven agrarian change, ongoing forest management interventions continue to disregard the effectiveness of upland livelihood practices and knowledge that are already well-adjusted to cyclical climatic variability. Although swiddening and other forms of forest use remain a vital part of household economy and subsistence in Inogbong, they are experiencing a relative and uneven decline as both a practiced reality and a viable way of life for some households. Recent climatological research suggests a potential intensification of El Niño events as a result of anthropogenic climate change (Cai et al., 2014). We, therefore, suggest that past, present and future governance interventions that aim to optimize and modernise livelihoods (already negotiating agrarian change) in order to overcome associated vulnerability may achieve the opposite outcome: induce dramatically deleterious pathways of subsistence insecurity among Pala'wan households in Inogbong (and beyond) during future disaster events. In this way, then, the impacts of the PTFPP, and newer conservation initiatives in the region drive the promotion of agricultural intensification and market integration in ways that reproduce a dangerous dependency on uncertain livelihood practices for the poor. None of these outcomes were intended by policy makers and planners of the PTFPP or other governance initiatives, but instead product of accreted and mutated biopolitical logics over time.

5. Making and governing vulnerability in conservation landscapes

More than ever, 'vulnerability' in many permutations, is deployed in the international work of governing human-environmental interaction. Despite this pervasiveness, vulnerability is not a single of binding concept with a clearly defined intellectual lineage, classificatory methodology or set of remedial practices. Instead, the term has come to represent an assemblage of loosely affiliated ideas and practices that are contextually deployed in varied combinations – often combining the language of systems-thinking (resilience, adaptation, perturbations, etc.) with older or existing governance imperatives. This is particularly true in the forested regions of Southeast Asia, where the drive to protect forests can often effectively no longer be articulated or funded without the imperative of building 'adaptive capacity' or supporting 'resilience' in communities deemed vulnerable, through a range of terms and designations, to both environmental and social change (Chandra et al., 2018; Taylor 2018). Despite the tremendous enthusiasm that surrounds these 'win-win' projects of socio-ecological enhancement, recent work drawing on Foucault's biopolitics has collectively highlighted unpredictable potency of this broadly defined vulnerability as a governing logic in disaster management, peacebuilding and varied other realms of global governance (e.g., Grove, 2014; Chandler and Reid 2016). This critical work highlights that deploying the language of vulnerability and deficiency is more than a semantic shift, and instead structures deeper and more comprehensive interventions than ever before into life with unpredictable effects.

The PTFPP on Palawan Island represents an early and prominent effort that fused conservation goals with addressing community vulnerability. Drawing on the literature that brings biopolitics into conversation with the study of environmental governance, we have argued that the fusion of conservation agendas with the need to alleviate vulnerability on Palawan Island has been expressed in a remit to reform not just livelihoods but the lives of indigenous peoples – with unpredictable outcomes over time. As shown, Pala'wan experiences with both extreme weather and forest governance have demonstrated the ways in which representations of socio-ecological fragility and weakness of indigenous life motivate governance initiatives that can produce or exaggerate forms of uneven exposure to the impacts of global environmental change. In addition to tempering optimistic visions that conservation efforts can readily and definitively solve problems of climate change adaptation and mitigation, these insights also offer a bridge between contemporary Foucauldian treatments of vulnerability as a potent discursive construct and work within political ecology that aims to empirically understand uneven experiences of environmental change (see Collins, 2008; Sovacool 2018; Taylor 2013). Our conceptual framing, we suggest, helps attend to the *recursive* relationship between the representational politics of vulnerability and the 'concrete' socio-material experiences of deprivation and disruption arising from biophysical phenomena.

At the same time, our examination of Pala'wan experiences through more recent conceptualisations of biopolitics concerned with issues of multiplicity and complexity further complicates dominant efforts in political ecology concerned with identifying clear 'root causes' and politically-charged culpability for the impact of climate change (e.g. Ribot 2014). In this case, confounding complexity can be readily seen in the ways that PTFPP project goals and aspirations have been taken up by indigenous leaders over time who rework older governance ideals in ways never intended by project planners. The acute experiences of hunger and struggle that Pala'wan people faced in 1997/8 as a result of changing livelihoods was beyond the intention of the Philippine state, foreign consultants who designed much of the project and indigenous people themselves who grasped new rhetoric and opportunities. The overlapping and shifting biopolitical logics of conservation practice in barangay Inogbong, operating over time through accretive and mutative process, points to a more distanced and 'decentred' conception of how governmental intervention might come to structure the

experiences of the rural poor (see Ferguson's (1990) discussion of 'authorless strategies'). Foremost among the implications of this decentring is a diffusion of blame that moves beyond simple assignment to abstracted historical processes or a monolithic 'state', to an understanding in which culpability might lie with a range of actors, institutions, technologies and finance. Our analysis therefore suggests that the uneven impacts of global environmental change might be located in the messy, unpredictable and morally unsatisfying nexus of the 'interlocking intentionalities of the developers and the "to-be-developed"' (Mosse, 2005, p. 10).

6. Conclusion

Drawing on a biopolitical lens for understanding the workings of environmental rule, this paper has examined the operation and impacts conservation interventions that continue to govern indigenous or marginal communities throughout Southeast Asia. As shown on Palawan Island, PTFPP policy and practice discursively positioned deficiencies in indigenous living as culpable for both environmental decline and their own vulnerability to change. This framing has rendered upland life open for detailed and comprehensive intervention. While the project did focus on disciplining forest use through the transformation of productive capacities into more environmentally palatable forms (primarily, agroforestry), achieving conservation goals and securing a stable life was seen to rest, ultimately, in the 'optimization' of indigenous people's health, education, social relations, patterns of residency, among other factors which were seen to obliquely drive forest use.

We have argued that the significance of this kind of discursive work, now increasingly common in environmental governance projects throughout Southeast Asia, has enabled 'power to operate on progressively more intimate levels in the name of securing life against an uncertain future' to promote not only specific livelihood activities but *ways of living* in forest landscapes (Grove, 2014, p. 206). In examining Pala'wan experiences in the 1997/8 El Niño drought and subsequent livelihood changes, we have demonstrated that nominally modern upland lives promoted by the PTFPP (oriented around sedentary, non-forest and market-based activities) are extremely sensitive to sustained droughts relative to poly-cropped and mobile swidden practices. Given the cyclical nature of El Niño events in the region, livelihood trajectories in which indigenous households move increasingly away from swidden agriculture towards sedentary, market-based alternatives undoubtedly point to a growth of acute vulnerability to future drought events.

In focusing on the sometimes-powerful discursive effects of vulnerability discourse, our aim is not to promote the abandonment of the term altogether as simply 'too dangerous'. Rather, we conclude here that taking up a focus on biopolitics helps sharpen attention to the way life is visioned and managed through *specific formulations* of vulnerability in environmental governance efforts, in addition to the term's problematic fusion with larger conservation goals. By emphasising the potency of conservation practices increasingly concerned with governing human 'life', this perspective should caution against easy and simplistic assignments of vulnerability that entail far-reaching prescriptions of capacity building that can, paradoxically, structure new and acute forms hunger and deprivation. Such simplification is by no means theoretical in southern Palawan. The assumed and pre-assigned vulnerability of indigenous swidden households remains widespread in the Philippines and, on Palawan Island, builds directly on the work of the PTFFP; both government and non-governmental organisations continue to draw on the language of vulnerability to call for more intensive governance of indigenous peoples in the form of protected areas that support resilience-building activities, with little critical reflection on the ways in which forest conservation itself might shape pathways of risk and exposure to environmental change (see Matias & Tabangay, 2014). Evading these simplifications requires a more dynamic understanding of diverse upland peoples and forest livelihoods in the context of environmental and agrarian change. For environmental policy makers, better knowledge of how forest-users actually manage and deal with environmental change is vital to support existing strategies, which are often long-standing and enmeshed in kin-based safety networks, rather than aspiring (largely by default) for a comprehensive reorganisation of livelihoods and lifeways.

Conflict of interest

None.

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